OIL AND GAS LEASING ON LANDS ADMINISTERED BY THE DIXIE NATIONAL FOREST

Final Environmental Impact Statement

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US Department of Agriculture
Forest Service
Dixie National Forest

Cooperating Agency:
US Department of the Interior
Bureau of Land Management

Cooperating Agency:
State of Utah

Final Environmental Impact Statement

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LEAD AGENCY:	Dixie National Forest U.S. Department of Agriculture
COOPERATING AGENCIES:	Bureau of Land Management Utah State Office U.S. Department of the Interior State of Utah
PROJECT LOCATION:	Garfield, Iron, Kane, Piute, and Washington Counties, Utah
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ABSTRACT

This Final EIS identifies Dixie National Forest lands that could be made available for oil and gas leasing, in accordance with the Mineral Leasing Act, under various leasing alternatives; describes the affected environment; and discusses reasonably foreseeable impacts of oil and gas activities on the human environment resulting from each leasing alternative. Issues and concerns expressed by the public and government agencies during the public comment period for this EIS have been addressed by the analysis. This analysis will be used by the Forest Supervisor of the Dixie National Forest and the Utah State Director of the Bureau of Land Management as the basis for making oil and gas leasing decisions under their authority. Alternative C is the preferred alternative.

PROJECTS WEBSITE

http://www.fs.usda.gov/goto/dixie/projects

EXECUTIVE SUMMARY

The following information is provided as a convenient synopsis for the public. However, this synopsis is not a substitute for review of the complete Environmental Impact Statement (EIS). If there are any inconsistencies between this summary and the EIS, the EIS should be considered the authoritative document.

In many parts of the United States, National Forest System lands overlie geological formations that may contain oil and/or natural gas. The US Forest Service's (Forest Service) national policy on minerals (USFS 2007a) states that the "Exploration, development, and production of mineral and energy resources and reclamation of activities are part of the Forest Service's ecosystem management responsibility." The Forest Service allows leases on many National Forest System lands for the purpose of drilling wells and extracting oil and/or gas (USFS 2007a). The Department of Interior, Bureau of Land Management (BLM), acts as the onshore leasing agent for the Federal Government. Forest Service regulations (36 CFR 228.102) developed in response to the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (Leasing Reform Act) require a leasing analysis be completed prior to offering leases on National Forest System lands (the federal leasing process is described in further detail in Section 1.8.5.1). The leasing analysis allows the Forest Service to decide whether or not federal lands under its administration will be administratively available for leasing, and under what conditions (leasing options) the leases will be issued. The National Environmental Policy Act (NEPA) of 1969 also requires the Forest Service, along with its cooperating agencies, to identify and assess potentially significant environmental impacts and address issues associated with oil and gas leasing.

Proposed Action and Decision

The Dixie National Forest, with the cooperation of the BLM, is conducting this environmental analysis to identify which lands administered by the Dixie National Forest with federal oil and gas rights to make administratively available for oil and gas leasing. The Dixie National Forest Supervisor will decide which areas of the Forest would be administratively available for leasing subject to the terms and conditions of the standard oil and gas lease form 3100-11 (BLM 2006a), or subject to constraints that would require the use of lease stipulations such as those prohibiting surface occupancy. The BLM Utah State Director will decide whether to offer for lease those National Forest System lands authorized for leasing by the Forest Service and make the required leasing decisions for non-federal lands with federal oil and gas ownership within the Forest Boundaries. The responsible officials of the Forest Service and BLM will release separate Records of Decision. The Records of Decision will not authorize specific, surface-disturbing activities. The Records of Decision will only make a decision about which lands would be available for oil and gas leasing and what conditions and stipulations would apply to any oil and gas leases offered in the future. Environmental impacts of future oil and gas exploration and development activities would undergo future, project-specific environmental analyses.

Purpose and Need

The current Dixie National Forest Land and Resource Management Plan was completed prior to the passage of the Leasing Reform Act and does not determine the availability of National Forest System lands for oil and gas leasing. The purpose of the Proposed Action is to complete a Forest-wide leasing analysis to comply with the Leasing Reform Act and the federal regulatory

requirements of 36 CFR 228, Subpart E, and 43 CFR 3100. This requires the Forest Service to analyze lands under its jurisdiction that are legally available for leasing.

Lands Involved in the Decision

The analysis area (Figure 1.5-1) includes all National Forest System lands on the four Dixie National Forest Ranger Districts, with the exception of lands with private surface rights that cover 79,521 acres. With these areas excluded, the analysis area is approximately 1,710,761 acres. This includes 481,264 acres, 404,283 acres, 388,603 acres, and 436,610 acres on the Pine Valley, Cedar City, Powell, and Escalante Ranger Districts, respectively (Table 1.5-1). Within the analysis area, there are also several areas that are not legally available for leasing. These areas cover a total of 85,503 acres and include designated wilderness areas, Brian Head Ski Area (which is under Special Use Authorization), the areas surrounding the Box-Death Hollow Wilderness Area known as Antone Bench and Areas 2, 3, 4, and 5, and National Forest System lands that have non-federal oil and gas rights. National Forest System lands with non-federal oil and gas rights are included in the analysis area since the Forest Service manages surface uses.

The analysis area encompasses approximately 13,454 acres of existing leases, of which approximately 9,495 acres on all or portions of 15 leases are within the Upper Valley Oil Field. The Upper Valley Oil Field is located in the southeast corner of the Escalante Ranger District and is the only producing oil field on the Dixie National Forest. Also, there are 3,380 acres of leased land on four different leases that predate the formation of the Box-Death Hollow Wilderness. The actual well sites on these leases were cherry-stemmed out of the wilderness when it was created and the wells are currently not producing. New leasing decisions made as a result of this analysis would not affect any of the existing leases; however, leased lands are included in the analysis so that when the leases expire the decision has been made whether or not to offer them for lease again and under what conditions. It is possible that currently leased lands would not be available for lease in the future or that they would be available with stipulations that are not in the current lease.

Relationship to the Forest Plan and other Legislation

Land and Resource Management Plan

The existing Dixie National Forest Land and Resource Management Plan was approved in 1986 and includes general decisions, as part of management prescriptions, to provide for oil and gas leasing, but does not include decisions for leasing specific lands. This EIS and decisions the Forest Supervisor will make, including availability of lands for oil and gas leasing, will be used to develop an amendment to the Land and Resource Management Plan.

Roadless Area Conservation Rule (2001)

The Forest Service identified Inventoried Roadless Areas (IRAs) nationwide as part of its 1972-1985 Roadless Area Review and Evaluation process. All the IRAs in the nation were reviewed again by the Forest Service in 1999 under the Roadless Area Conservation Initiative. In November 2000, the Forest Service issued the Final EIS for the proposed Roadless Area Conservation Rule. The final Roadless Area Conservation Rule was published in the Federal Register on January 21, 2001 (66 FR 3244). For the purpose of this analysis, IRAs are considered to be those areas identified in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000. The Forest Service Roadless Area Conservation Rule applied to Forest

Service actions in all IRAs. The Roadless Area Conservation Rule prohibits a Forest Service responsible official from approving road construction and reconstruction and the cutting, sale, or removal of timber in IRAs except when the responsible official determines certain circumstances apply (36 CFR 294; currently under the directive of the Secretary of Agriculture).

There are 38 IRAs on the Dixie National Forest encompassing 570,786 acres of National Forest System land, which represents approximately 35 percent of the analysis area for this EIS. As IRAs represent such a large proportion of the Dixie National Forest, any changes in the roadless area conservation due to judicial actions would impact potential oil and gas leasing and this analysis. As a result, this analysis evaluates a range of alternatives that include leasing options prohibiting road construction and timber removal which meets the intent of the 2001 Roadless Area Conservation Rule, as well as other leasing options that allow new disturbance within IRAs for oil and gas exploration and development (assuming future changes in the status of the 2001 Roadless Area Conservation Rule would allow this). This provides a framework to make decisions concerning oil and gas leasing in these areas should any changes occur in the legal status of the 2001 Roadless Area Conservation Rule in the future.

Federal Onshore Oil and Gas Leasing Reform Act of 1987

The Leasing Reform Act amended the Mineral Leasing Act of 1920 to provide the Forest Service with more input on oil and gas leasing on National Forest System lands. Under the Leasing Reform Act the authority to issue all leases for the production of federally owned oil and gas remained with the BLM. However, the Forest Service's decision to lease with certain stipulations is binding on the BLM for all federal minerals on National Forest System lands, if the BLM decision is to offer the leases for sale.

Energy Policy Act of 2005

The Energy Policy Act of 2005 directs the Secretaries of the Interior and Agriculture to improve administration of federal oil and gas leasing programs. This includes the improvement of inspection and enforcement of oil and gas activities. It also requires the development and implementation of best management practices (BMPs). In addition, it requires the Secretaries of the Interior and Agriculture to enter into a Memorandum of Understanding (MOU) to improve coordination and consultation on oil and gas leasing activities.

Potential Oil and Gas Activity the Dixie National Forest

The potential for oil and gas activity on the Dixie National Forest is described in the Reasonably Foreseeable Development Scenario (RFDS). The RFDS is an estimate of future oil and gas activity, based primarily on known geologic potential for oil and gas occurrence and on past exploration and development activity in and near the Dixie National Forest. The scenario is also developed with consideration of other factors such as economics, technology, physical limitations on access, existing or anticipated infrastructure, and transportation. It is possible that the actual level of oil and gas activity that occurs on the Dixie National Forest may be less, or more, than estimated by the RFDS.

The RFDS indicates that roughly the southern one-third to one-half of the Cedar City, Powell, and Escalante Ranger Districts have high or moderate potential for oil and gas development. The entire Pine Valley Ranger District is rated as having low development potential. Current oil and gas industry interest, which is reflected in the lands nominated for lease sales between 2005 and 2006, is somewhat evenly distributed among the Cedar City, Powell, and Escalante Ranger Districts. Using this information, the RFDS projects a maximum of 60 exploration wells

over 15 years following leasing, or a Forest-wide average of four wells per year. When adjusted by Ranger District, the number of exploration wells that could occur over the 15-year period is:

Pine Valley:	5 wells; an average of one well every three years
Cedar City:	15 wells; an average of one well per year
Powell:	20 wells; an average of four wells every three years
Escalante:	20 wells; an average of four wells every three years

In order to fully evaluate the environmental effects of concurrent exploration activity for this analysis, it can reasonably be assumed that three exploratory drilling operations could occur at one time on each of the Ranger Districts. Furthermore, exploratory drilling during this period could result in a discovery of one oil and gas field with 20 production wells. Due to uncertainty as to where this field would be located, the environmental impacts are evaluated as if it were to occur on each of the Ranger Districts. During the same time period, it is expected that a total of 700 linear miles of seismic line data (i.e., geophysical surveys) could be collected on the Dixie National Forest over the next 15 years, with 100 miles estimated to occur on the Pine Valley Ranger District and 200 miles expected to occur on each of the other Ranger Districts. It is assumed that 50 to 100 linear miles of seismic lines could occur on each of the Ranger Districts in any year (BLM 2007a). It is estimated that approximately half of these miles would be obtained using helicopter-portable equipment.

Significant Issues and Alternative Development

Public and Agency Scoping

The Notice of Intent (NOI) for this EIS was published on December 29, 2006 in the Federal Register, Volume 71, No. 250, Page 78395. The publication of the NOI initiated the formal scoping period. A legal notice describing the proposal and requesting scoping input was also published in *The Spectrum,* St. George, Utah on December 30, 2006 and press releases were sent to the *Cedar City Review* and *Daily News*, Cedar City, Utah and *Garfield County Insider*, Panguitch, Utah. Scoping letters requesting scoping input were sent to interested individuals, agencies, and groups. Scoping meetings were held in St. George, Cannonville, and Cedar City. An additional open house was held in Escalante, Utah.

Key Issues

Through public scoping, 13 key resource issues were identified and alternatives were developed to address these issues. Measurement indicators were also developed to quantify the environmental impacts to each identified resource. The key resource issues include:

- Issue #1: Post-leasing activities could decrease visual integrity and quality, could impact viewsheds, and could have an impact on night skies.
- Issue #2: Post-leasing activities could impact the characteristics and attributes of IRAs.
- Issue #3: Post-leasing activities could degrade the values of eligible Wild and Scenic Rivers and could make these areas ineligible for future inclusion in the National Wild and Scenic River System.
- Issue #4: Post-leasing activities could impact hunting, fishing, recreation, and tourist activities and developed and dispersed recreational sites.

- Issue #5: Post-leasing activities could impact aquatic and terrestrial wildlife and their habitats.
- Issue #6: Post-leasing activities could impact Threatened, Endangered, Proposed, Candidate, Forest Sensitive, and Management Indicator (MIS) species and their habitats, including Designated Critical Habitats.
- Issue #7: Post-leasing activities could impact flow and water quality of surface streams and groundwater, sensitive aquifers, developed water systems, floodplains, wetlands, and riparian areas.
- Issue #8: Post-leasing activities could impact steep slopes and unstable and erodible soils.
- Issue #9: Post-leasing activities could impact major vegetation types, areas containing unique vegetation, biological and chemical crusts, and gypsum type soils, and could introduce noxious weeds.
- Issue #10: Post-leasing activities could increase traffic levels on public roads and forest roads and increase accessibility to other federally-administered lands.
- Issue #11: Post-leasing activities could impact public and private revenues, populations, community services, infrastructure, tourism, and fire management.
- Issue #12: Post-leasing activities could impact air quality.
- Issue #13: Post-leasing activities could impact Research Natural Areas, botanical and geologic trails, scenic byways, national recreation trails, administrative sites, and the Side Hollow Ponderosa Pine Provenance Study Area.

Leasing Options

Alternatives were developed by assigning various leasing options to the resources identified through public scoping. The alternatives were analyzed by applying the leasing options to site-specific resources using a geographic information system (GIS). The leasing options used in development of the alternatives include stipulations listed in the *Uniform Format for Oil and Gas Lease Stipulations* (NSO, TL, and CSU) published by the Rocky Mountain Regional Coordinating Committee in March 1989 (RMRCC 1989). Leasing options used include:

NO LEASE (NL)

All federal minerals within the analysis area would not be administratively available for leasing. Existing leases would remain in effect until they terminate or expire.

NO SURFACE OCCUPANCY (NSO)

Use or occupancy of the land surface for fluid mineral exploration or development is prohibited. With the exception of seismic exploration, NSO applies to all uses and facilities associated with oil and gas development.

TIMING LIMITATIONS (TL)

The TL stipulation (often called seasonal restrictions) prohibits surface use during specified time periods. A TL applies for restrictions longer than 60 days and shorter than one year.

CONTROLLED SURFACE USE (CSU)

The CSU stipulation is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values, or resource concerns, lease activities must be strictly controlled. The CSU stipulation is used to identify constraints on surface use or operations that may otherwise exceed the mitigation provided by Section 6 of the standard lease terms and the regulations and operating orders.

LEASE NOTICE (LN)

Any requirements contained in a LN must be fully supported in a law, regulation, SLT, or onshore oil and gas order. A LN is attached to leases to transmit information at the time of lease issuance to assist the lessee in submitting acceptable plans of operation or to assist in administration of leases. A LN is attached to leases in the same manner as stipulations; however, a LN does not involve new restrictions or requirements.

STANDARD LEASE TERMS (SLT)

Under the SLT, the lessee has the right to use as much of the leased lands as is necessary to explore or drill for, extract, remove, and dispose of oil and gas deposits that may be in the leased lands, together with the right to build and maintain necessary improvements thereon. SLT requires the operator to conduct operations in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, visual, and other resources and land uses or users. Operations cannot violate any other federal environmental protection laws (e.g., Clean Air Act, Clean Water Act, Endangered Species Act, etc.). Measures to avoid impacts to specified resources include, but are not limited to, the modification to the siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Well sites may be moved up to 200 meters (656 feet) and operations delayed for up to 60 days without interfering with the lease rights.

Alternatives Considered in Detail

Five alternatives were developed and were assigned a letter (A – E). Alternative A is the no action/no lease alternative and would not authorize new oil and gas leasing on the Dixie National Forest. Alternatives B – E all allow some amount of new oil and gas leasing. The differences between Alternative B – E are in the leasing options applied that would restrict where and under what conditions oil and gas leasing could occur. In general, Alternative B applies the most restrictive leasing options and Alternate E the least restrictive. Alternatives C and D and fall between B and E in term of the leasing options applied.

Alternative A: Section 1502.14(d) of the NEPA regulations requires the analysis of a No Action Alternative. Under Alternative A, present management activities as pertaining to oil and gas leasing would continue unchanged. The Forest Supervisor can also select a Forest-wide No Lease Alternative that would not allow leasing anywhere on the Forest. This would be different from not taking any action, as in the No Action Alternative, since a decision would be made that would prohibit leasing. Both options would result in no new oil and gas leasing and have been combined for analysis purposes. The Forest Supervisor under this alternative would not make any new leasing decisions and no new oil and gas leasing would be allowed on the Dixie National Forest. Existing leases, including those associated with the Upper Valley Oil Field, would not be affected. However, when these leases expire no new leases would be authorized in these areas.

Alternative B: Alternative B was developed in order to address comments offered by conservation groups during the public scoping and through discussions with the groups following the initial scoping period. Alternative B would make leasing decisions, including identification of leasing options, as required by 36 CFR 228.102(d) for Dixie National Forest lands. Alternative B would emphasize the protection of particular resources through the application of restrictive leasing options. With the exception of Alternative A, this alternative would apply equal or more restrictive leasing options to the resource components than any of the other alternatives. A NL option would be applied to IRAs regardless of legal decisions concerning the 2001 Roadless Area Conservation Rule and dual analysis of this alternative is not necessary.

Alternative C: Alternative C was developed to be consistent with the management direction and the standards and guidelines identified in the Land and Resource Management Plan; however, an amendment to the existing Land and Resource Management Plan would still be required. Alternative C would make leasing decisions, including identification of leasing options, as required by 36 CFR 228.102(d) for Dixie National Forest lands. The leasing options under Alternative C would generally be less restrictive than under Alternative B, but more restrictive than Alternatives D and E. For example, in some resource areas such as IRAs, recreation, fish and wildlife, and water and watershed resources, where Alternative B would apply a more restrictive stipulation, Alternative C may have a less restrictive stipulation. Many of the leasing options are the same across these two alternatives; however, less area is restricted with a 'No Lease.'

Alternative D: Alternative D would make leasing decisions, including identification of leasing options, as required by 36 CFR 228.102(d) for Dixie National Forest lands. Alternative D would also require an amendment to the Land and Resource Management Plan. This alternative is less restrictive in regard to oil and gas development and more land would be available for lease under SLT than under either Alternatives B or C. Leasing options are generally less restrictive than Alternative C. However, in many cases the leasing options are the same as under Alternative C. It is more restrictive than Alternative E.

Alternative E: Alternative E would open the majority of the Dixie National Forest to leasing under the standard lease terms and conditions contained on BLM Lease Form 3100-11, with the exception of IRAs with the 2001 Roadless Area Conservation Rule. This is the least restrictive alternative in regard to oil and gas development. An amendment to the Land and Resource Management Plan would be required.

Dual Analysis of Alternatives

Due to uncertainty in the future status of the 2001 Roadless Area Conservation Rule, alternatives D and E underwent a dual analysis. The dual analysis consists of analyzing the environmental impacts of the alternatives under two scenarios: (1) each alternative is analyzed with a NSO stipulation applied to IRAs that would prohibit road construction and timber harvest following the intent of the 2001 Roadless Area Conservation Rule, and (2) each alternative is analyzed based on less restrictive leasing options that would allow new disturbances for oil and gas exploration and development in IRAs, including roads, wells, and other facilities. The second scenario in the dual analysis process provides the framework to make decisions concerning oil and gas leasing in these areas should any changes in the applicability of the 2001 Roadless Area Conservation Rule occur in the future due to judicial actions. With the exception of IRAs, the leasing options applied to other resource components would be the same under both scenarios of the dual analysis. However, the spatial distribution of many resource

components overlaps with IRAs. As a result, the amount of land available under each leasing option differs depending upon the scenario.

Affected Environment

The scenic beauty of the Dixie National Forest is one of its major attractions. Scenic resources are a composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify an area and influence the visual appeal that area may have to people. Concern Level 1 (user-rated high importance) areas on the Dixie National Forest include scenic byways such as Highway 12 through the towns of Escalante and Boulder, and the many viewsheds across the Forest. The night sky views on the Dixie National Forest are also an invaluable resource to many residents and visitors.

IRAs are generally areas without mechanically constructed roads and that contain important environmental values, including nine different features identified in the 2001 Roadless Area Conservation Rule and seven attributes that characterize wilderness potential. IRAs on the Dixie National Forest are frequently adjacent to wilderness areas.

Recreational resources on the Dixie National Forest attract over half a million visitors per year, most of who come to view natural features or wildlife. Between 35-40 percent of visitors come to hike, walk, or drive for pleasure. Annual daily traffic is highest on State Highway 12, such as through Red Canyon (Powell Ranger District) and Upper Valley (Escalante Ranger District), and on State Highway 18 (Pine Valley Ranger District) and U.S. Highway 89 (between Cedar City and Powell Ranger Districts). Other popular activities include downhill skiing, fishing, camping, picnicking, OHV use, and hunting. There are approximately 65 developed recreation areas on the Dixie National Forest, including campgrounds and visitor centers, which are located along the scenic byways and backways. Many developed sites and recreation residences are clustered near the Pine Valley, Duck Creek, and Navajo Lake Recreation Areas. Dispersed recreation opportunities occur throughout the Dixie National Forest and include camping, hiking and equestrian use, mountain biking, hunting and fishing, and winter sports.

The Dixie National Forest contains many wildlife species, including small and large mammals, reptiles, and migratory birds that are protected by the Migratory Bird Treaty Act and other legislation. Migratory bird nests can be found in wet habitats as well as ponderosa pine/woodland, aspen, pinyon juniper, and conifer forest; most nests are found on the ground but may also occur in trees or shrubs. Native fisheries can be found in the 400 miles of aquatic habitat (streams, lakes, and reservoirs) on the Dixie National Forest. Blue Ribbon Fisheries include Panguitch Lake, MaGath Lake, Paragonah (aka Red Creek) Reservoir, and Panguitch Creek. Game fishes that are stocked in lakes and reservoirs on the Forest include tiger trout, splake, and smallmouth bass.

Six threatened, endangered, or candidate (TEC) species are known or suspected to occur on the Dixie National Forest or in waters that flow from the Dixie National Forest. These species include two endangered fishes, three birds (California condor, Mexican spotted owl, and western yellow-billed cuckoo), and Utah prairie dog. Designated Critical Habitat for Mexican spotted owl occurs on the Escalante Ranger District. Many Forest-designated Sensitive species are also known or suspected to occur on the Forest, and include two cutthroat trout species, boreal toad, pygmy rabbit, two bat species, northern goshawk, greater sage-grouse, peregrine falcon, bald eagle, flammulated owl, three-toed woodpecker, bighorn sheep, and 24 plants.

There are approximately 6,243 miles of perennial and intermittent streams within the Dixie National Forest boundary, in addition to 1,971 mapped springs and over 1,079 lakes and reservoirs. Wetlands on the Forest have not been mapped but most are typically located near waterbodies. Floodplains are generally narrow on the Forest because the majority of streams are small and constrained by geology and topography. Riparian areas are generally demarcated by willow (*Salix* spp.) stands in upper elevations, and by cottonwood (*Populus angustifolia*), dogwood (*Cornus stolonifera*), and birch (*Betula fontinalis*) at lower elevations.

The Dixie National Forest straddles the major surface water divide between the Colorado River Basin and the Great Basin. Within the Colorado Plateau, several tributaries head in the Dixie National Forest: Beaver Dam Wash, Santa Clara River, Quail Creek, Ash Creek, North Fork Virgin River, and East Fork Virgin River, which all flow to the Virgin River prior to entering the Colorado; Kanab Creek and its tributary Johnson Wash; the Paria River; and the Escalante River. Within the Great Basin, Dixie National Forest lands produce flows that are tributary to the Sevier River or that flow to internal playa-type basins within the Sevier River watershed. Shoal Creek, Pinto Creek, Coal Creek, and Parowan Creek all head in the Dixie National Forest, and flow to internal basins located outside of the Forest. Bear Creek, Panguitch Creek, Mammoth Creek, and East Fork Sevier River are tributary to the Sevier River. Typical of high elevation lands, much of the Dixie National Forest serves as recharge areas for shallow and regional aquifers, eventually supplying groundwater to the lower elevation, off-Forest lands.

Many local communities obtain culinary and agricultural water from sources located on the Dixie National Forest. Extensive water developments such as reservoirs, diversions, and ditches have been constructed on the Forest to support these and other uses. The primary consumptive uses of surface water include off-Forest irrigation and culinary water supply. On-Forest uses include domestic water supplies for campgrounds and livestock/wildlife watering, and non-consumptive in-stream flows for aquatic habitat maintenance and recreation.

The Dixie National Forest spans a zone of geologic transition from the block faulting and complex rock types of the Basin and Range physiographic province in the west to the gently warped plateau and sedimentary strata of the Colorado Plateau physiographic province in the east. Major vegetation communities on the Dixie National Forest include pinyon-juniper (26% of the Forest), aspen conifer (15% of the Forest), and sagebrush steppe (14% of the Forest). Invasive plants are found mainly in disturbed soils on the Forest. The Red Canyon Botanical Area on the Powell Ranger District contains many sensitive plants, bristlecone pine trees, and pink tertiary Claron Limestone Formation. The Side Hollow Ponderosa Pine Study Area is a five-acre research area devoted to pine tree genetic studies. Research Natural Areas that have been set aside to preserve exemplary vegetation types over the long term on the Forest include Red Canyon (531 acres; Powell Ranger District), Timbered Cinder Cone (225 acres; Cedar City Ranger District), Table Cliff (1,445 acres; Escalante Ranger District), Browse (2,055 acres; Pine Valley Ranger District), and Upper Sand Creek (540 acres; Escalante Ranger District).

The Dixie National Forest lies within five Utah Counties: Garfield, Washington, Iron, Kane, and Piute. County economies are driven by government (Iron), tourism (Garfield, Kane, and Wayne), agriculture (Garfield and Paiute), mining (Paiute), and trade/transportation/utilities and construction (Washington). The federal government is the prominent land administrator in each county. The fasted growing counties are Washington, followed by Iron County, due to population growth in and around St. George (Washington County) and the accreditation of Southern Utah University that has resulted in an increased student population (Iron County). The nearest communities to the Dixie National Forest boundary include Cedar City, St. George, Hilldale, Panguitch, Escalante, Boulder, Parowan, Tropic, Henrieville, and Cannonville.

Active mixing of air and average precipitation for Utah, along with an absence of major air pollution sources results in low pollutant background values for the Dixie National Forest. Prescribed burns and wildfires are a source of air pollution, but in general, the air quality within the Forest is considered good to excellent. Recreational use, residential heating for support facilities, and limited vehicle traffic constitute the main sources of emissions.

Environmental Consequences – Direct and Indirect Effects

The authorization of a lease does not cause environmental impacts; however, authorizing a lease grants the lessee the right to conduct oil and gas activities in the future. The environmental consequences of oil and gas activities, therefore, are analyzed in this EIS as connected actions to oil and gas leasing.

Oil and gas activities that are expected to occur on leases include seismic exploration, exploratory drilling, and development and production. During seismic exploration, some surface disturbance would occur from overland travel by buggies (60-120 acres per Ranger District) and seismic blasts would cause temporary noise disturbances. The introduction of invasive plants is a possibility during overland travel for seismic activities. Relatively more surface disturbance would occur for exploratory drilling (83-332 acres per Ranger District) due to land clearing for short-term roads and pads, as well as noise, visual effects, traffic, and increases in employment and spending for certain supplies associated with drilling. During production field development, 254 acres of surface disturbance would occur due to land clearing for long-term roads, pads, flow lines, storage tank batteries, and other facilities. Development and production disturbances would be long term (≥10 years). Oil and gas activities could degrade the visual quality of an area for as long as the activity occurred, depending upon the amount of contrast between the natural and constructed landscape, the viewing distance, and the concern of the viewer for visual quality. The greatest contrast would occur in sensitive areas such as those designated High Scenic Integrity Objective (e.g., scenic byways). Land-clearing surface disturbance removes topsoil (although it can be stockpiled for reclamation) and vegetation from the land, which also impacts habitat for wildlife, increases erosion potential, and depending on the location, can remove acreage from special or unique areas such as IRAs or Research Natural Areas. Road building is the activity most likely to impact water and watershed resources and fisheries, and may also introduce invasive plants.

Impacts to some resources would not change between the Action Alternatives B, C, D, and E, due to either 1) absence of assigned leasing options, 2) possibility of spill events regardless of leasing options, or 3) possibility of impacts associated with the spread of invasive plants, which could occur under any leasing option that allows surface disturbance. Resource components for which impacts are similar under all Action Alternatives (B-E) include major vegetation types (no leasing options; moderate impacts possible), misc. wildlife species (no leasing options; moderate impacts possible), biological soil crusts (no leasing options; minor impacts possible), and socioeconomics (moderate impacts possible). Impacts to other resources would differ under each alternative because alternatives carry different leasing options for each resource component, which restrict activities to varying degrees. Impacts under each alternative are summarized below.

<u>Alternative A</u>

There would be no adverse impacts to resources under Alternative A because no new leases would be authorized, and no connected actions associated with new oil and gas leasing would occur on the Dixie National Forest.

Alternative B

A NL or NSO leasing option would be applied to much of the Dixie National Forest under Alternative B. Less restrictive leasing options would be applied to 4 percent of the Forest. Alternative B applies a larger buffer (500 feet) around waterbodies on the Dixie National Forest than the other alternatives (300 feet). On lands covered by NSO, temporary noise or visual disruptions may cause minor adverse impacts within Semi-Primitive or Roaded Natural Recreational Opportunity Spectrum (ROS) areas, or within Low or Moderate SIO areas. Moderate adverse impacts are possible for Utah prairie dog and Forest-sensitive plants due to potential habitat losses. Minor impacts may occur to migratory birds, including some special status species, pygmy rabbit, Forest-sensitive bats, streams/lakes/springs/etc, caves, and the Red Canyon area. Alternative B impacts may be the most severe within sensitive soil types, including rockfall areas, steep or unstable slopes, or areas with high erosion potential.

Alternative C

Potential impacts to many resource components, including recreation resources, sensitive soils, fish and wildlife, and vegetation resources would be similar to Alternative B due to similar leasing options under both alternatives. Impacts under Alternative C would be more adverse to many special status species, and water resources, due to the allowance of some surface occupancy and the unknown location of the disturbance. Impacts to IRAs, Unroaded-Undeveloped Areas, and eligible Wild and Scenic Rivers could also occur under Alternative C due to NSO or CSU stipulations, respectively, which would not be possible Alternative B.

Alternative D1 (NSO in IRAs)

Under Alternative D1, impacts to IRAs, Unroaded-Undeveloped Areas, eligible Wild and Scenic Rivers, recreation resources, streams/lakes/springs/etc, and many special status species, and vegetation resources under this alternative would be similar to or the same as under Alternative C. Relative to Alternative C, more adverse impacts would be possible to SIO High and Very High areas, night skies, aquatic species, MIS and Sensitive fishes, greater sage-grouse, big game, Sensitive raptors, municipal watersheds, soil resources, and Research Natural Areas.

Alternative D2 (CSU in IRAs)

Few impacts to resources besides IRAs would be measurably different under this alternative than under Alternative D1. Only those resource components that overlap substantially with IRAs would have measurably greater adverse impacts under this alternative relative to Alternative D1. These resources include Semi-Primitive Non-Motorized ROS areas and Mexican spotted owl Designated Critical Habitat. These areas overlap with IRAs so impacts would be slightly more adverse under Alternative D1, although CSU stipulations would still apply and provide some protection to these resources. Moderate impacts to Mexican spotted owl would be possible due to habitat impacts during periods of low occupancy, and in the case of Semi-Primitive Non-Motorized areas, although oil and gas activities would be restricted to minimize impacts under CSU, developments would still be possible in these areas and could compromise the characteristics of the Semi-Primitive Non-Motorized ROS.

Alternative E1 (NSO in IRAs)

Alternative E1 impacts that are relatively more adverse than Alternative D1 or D2 would include those to suitable Wild and Scenic Rivers, recreation resources, migratory birds, endangered fish species, Utah prairie dog, greater sage-grouse, Sensitive bats, streams/lakes/springs/etc, municipal watersheds, rockfall areas, and caves. In general, major adverse impacts would be possible to many resources under Alternative E1 (and E2) due to the lack of protective leasing options. Potentially major impacts are possible to developed recreation sites, recreation

residences, Utah prairie dog, Mexican spotted owl, sage grouse, rockfall areas and steep slopes, Research Natural Areas, and Botanical/Geological Areas.

Alternative E2 (SLT in IRAs)
As for Alternative D2 (relative to D1), few impacts to resources besides IRAs would be measurably different under this alternative (E2) relative to Alternative E1. Besides IRAs, resource components for which impacts may be measurably more adverse (i.e., potentially major) under this alternative include Primitive and Semi-Primitive Non-Motorized ROS areas, Mexican spotted owl habitat, and within the Side Hollow Ponderosa Pine Provenance Study Area.

Environmental Consequences – Cumulative Effects

Cumulative effects are the total effect, including direct and indirect effects, on a given resource resulting from the incremental impact of past, present, and reasonably foreseeable future actions. They can result from individually minor, but collectively significant actions taken over a period of time. Cumulative effects may arise from single or multiple actions and the effects may be additive or interactive. The net adverse effect of interactive actions may be less than the sum of the individual effects (countervailing) or the actions may interact to create a net adverse cumulative effect that is greater than the sum of the individual effects (synergistic). The magnitude and extent of the effect on a resource depends on whether the cumulative effects exceed the ability of a resource to function at a desired level (CEQ 1997).

Under all action alternatives, connected actions as a result of full development of the RFDS could result in cumulative effects related to road maintenance costs and public safety if an oil field were developed and resulted in adding additional truck traffic to those routes currently used to transport oil from the Upper Valley oil field. This impact would be long term and moderate. Similarly, cumulative effects could occur if both a production field and the potential Coal Hollow Mine were to transport product on the same routes. This impact would be long term and major. Cumulative impacts would also be possible under all action alternatives (B-E) to the following resources: Moderate Scenic Integrity Objective areas (visual resources), air resources (including ozone, $PM_{2.5}$, and climate change) migratory birds, unstable soils and caves, major vegetation types that are at risk, and noxious weeds. Cumulative impacts to big game would be possible under Alternatives C-E. Cumulative impacts would be possible under Alternatives D and E for suitable Wild and Scenic Rivers, recreation resources, aquatic species, greater sage-grouse, Forest-sensitive plants, Mexican spotted owl, water and watershed resources, and Research Natural Areas. Cumulative impacts to IRAs would be possible under alternatives for D2 and E2, with CSU and SLT in IRAs, respectively.

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